

## CLAIMS

What is claimed is:

1           1.     An apparatus comprising:

2           a needle cannula having a distal point, a proximal end and further having a shaft  
3     with a circumference;

4           a tip protector having a base, the tip protector defining an opening to receive the  
5     needle cannula shaft and the tip protector is slideably mounted thereon;

6           means coupled to the tip protector for blocking the tip protector opening so as to  
7     enclose the distal point of the needle cannula within the tip protector;

8           a gasket coupled to the tip protector base defining an opening of a size to receive  
9     the needle cannula shaft;

10          means coupled to the needle cannula shaft impeding movement of the tip  
11     protector along the needle cannula shaft beyond a pre-determined distance from the  
12     needle cannula distal point.

1           2.     The apparatus of claim 1 further comprising a flash chamber coupled to  
2     the needle cannula at the needle cannula proximal end

3           3.     The apparatus of claim 1, wherein the gasket is formed in place at the tip  
4     protector base of an adhesive material.

1           4.     The apparatus of claim 3, wherein the gasket adhesive material is selected  
2     from the group consisting of paraffin, polyester and polyamide.

1           5.     The apparatus of claim 3, wherein the gasket adhesive material is cured by  
2     exposure to ultraviolet light.

1           6.     The apparatus of claim 1 wherein the blocking means comprises:  
2           a tab having a length sufficient to block the tip protector opening, the tab  
3     pivotably coupled to the tip protector within the tip protector opening and slideably  
4     engaging the needle cannula shaft in a first biased position such that upon removal of  
5     the needle cannula shaft the tab is free to pivot to a second position extending across the  
6     tip protector opening.

1           7.     The apparatus of claim 1 wherein the impeding means comprises:  
2           an irregularity in the needle cannula shaft circumference a pre-determined  
3     distance from the needle cannula distal point occluding passage of the needle cannula  
4     shaft through the gasket opening.

1           8.     The apparatus of claim 6, wherein the tab is an anti-stick metal tab.

1           9.     The apparatus of claim 7, wherein the irregularity is a crimp inscribed in  
2     the needle cannula shaft.

1           10.    The apparatus of claim 6, wherein the tip protector further comprises:  
2           a superstructure coupled to the base;  
3           a cylindrical anti-stick metal clip housed within the superstructure defining an  
4     opening to receive the needle cannula shaft, the clip housing the tab, the tab disposed  
5     within the clip opening such that in its first position the tab is biased against the needle  
6     cannula shaft and in its second position the tab pivots to block the clip opening.

1           11.    The apparatus of claim 10, wherein the tip protector is optically  
2     transparent, the cylindrical clip opening is a first opening, and the clip further defines a

second opening extending over a portion of the cylindrical circumference exposing a portion of the first opening.

12. A medical intravenous catheter comprising:

a needle cannula having a distal point, a proximal end and a shaft having a circumference;

a tip protector of a pre-determined length having a proximal end including a base and a distal end including a superstructure, the tip protector defining an opening to receive the needle cannula shaft and slideably mounted thereon;

a flash chamber having a distal end and a proximal end, wherein the flash chamber distal end is coupled to the needle cannula proximal end, the flash chamber further having walls extending from the flash chamber distal end defining a space to receive the tip protector;

an anti-stick metal clip housed within the tip protector superstructure defining an opening concentric with the tip protector opening;

a biased tab of a length sufficient to extend across the clip opening pivotably disposed within the clip opening such that in its first position the tab engages the needle cannula shaft and when the shaft is withdrawn, the tab pivots to occupy a second position blocking the clip opening;

a formed in place gasket at the tip protector base defining an opening of a size to receive the needle cannula shaft;

a crimp inscribed into the needle cannula shaft at a pre-determined distance from the needle cannula distal point occluding passage of the needle cannula shaft through the gasket opening, the pre-determined distance of the crimp being commensurate with the tip protector length such that moving the tip protector to the point where the crimp

23 occludes the needle cannula shaft also moves the tab beyond the needle cannula shaft  
24 so as to free the tab to pivot to its second position;

25 a catheter housing, having a catheter hub and further defining an opening,  
26 coupled to the tip protector so as to cover the tip protector and at least a portion of the  
27 needle cannula wherein the needle cannula distal point extends through the catheter  
28 housing opening;

29 a flash plug coupled to the flash chamber proximal end.

1 13. The medical IV catheter of claim 12, wherein the tab further comprises a  
2 lubricated surface engaging the needle cannula shaft in its first position.

1 14. The medical IV catheter of claim 12, wherein the needle cannula shaft  
2 further comprises a lubricated surface.